



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,091	07/22/2004	Hiroaki Sudo	L9289.04147	4015

24257 7590 04/25/2007
STEVENS DAVIS MILLER & MOSHER, LLP
1615 L STREET, NW
SUITE 850
WASHINGTON, DC 20036

EXAMINER

KHAN, IBRAHIM A

ART UNIT	PAPER NUMBER
----------	--------------

2617

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/502,091	Applicant(s) SUDO, HIROAKI	
	Examiner Ibrahim A. Khan	Art Unit 2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statements submitted on 07/22/2004 has been considered by the Examiner and made of record in the application file.

Claim Objections

3. Claim 27, which is an apparatus claim, is objected to because it a dependent of claim 21, which is a method claim. Appropriate correction is advised.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Walton et al.** (US 20030081538) in view of **Arai et al** (US 6456607)

Consider **claim 1**, Walton discloses an OFDM-CDMA transmitting apparatus (*abstract, figure 3*) comprising:

a spreading section that spreads transmit symbols (*see figure 3, page 1 paragraph 0010 and 0011, page 2 paragraph 0029* where Walton discloses a data spreader at a transmitter unit);

an orthogonal frequency division multiplexing section that distributes a multiplexed spread signal among a plurality of subcarriers (*see page 1 paragraph 0009, page 3 paragraph 0040, 0041 and 0044* where Walton a OFDM section that transforms the spread symbols into OFDM symbols).

Walton however, does not specifically disclose a number of multiplexing selection section that selects a number of multiplexing for each transmit symbol a multiplexing section that multiplexes a spread signal of each transmit symbol using a selected number of multiplexing. In the related art Arai discloses a transmitter having a spread code generating circuit and a multiplex number control unit that changes the number of multiplexing based on the transmission conditions (*see figure 1 block 112, figure 2 block 210 and figure 5 block 502 and 501, figure 6 block 602 and 601, column 6 lines 47-50 and 54-57, column 7 lines 10-13, 26-28 and 38-42, column 9 lines 42-58, column 10 lines 1-5 and 47-61, column 11 lines 6-10 and 14-20*)

It would have been obvious to one of ordinary skill in the art to modify the teachings of Walton with a number of multiplexing selection section as disclosed by Arai in order to control the information amount matching the transmission path conditions (*see column 1 lines 60-66*)

Consider **claim 21**, Walton discloses an OFDM-CDMA transmitting method (*see figure 3, page 1 paragraph 0010 and 0011, page 2 paragraph 0029 where Walton discloses a data spreader at a transmitter unit*) (*also see page 1 paragraph 0009, page 3 paragraph 0040, 0041 and 0044 where Walton a OFDM section that transforms the spread symbols into OFDM symbols*) but does not disclose making a number of code division multiplexing of a specific transmit symbol smaller than a number of code division multiplexing of other transmit symbols. In the related art Arai discloses a transmitter having a spread code generating circuit and a multiplex number control unit that changes the number of multiplexing based on the transmission conditions (*see figure 1 block 112, figure 2 block 210 and figure 5 block 502 and 501, figure 6 block 602 and 601, column 6 lines 47-50 and 54-57, column 7 lines 10-13, 26-28 and 38-42, column 9 lines 42-58, column 10 lines 1-5 and 47-61, column 11 lines 6-10 and 14-20*)

It would have been obvious to one of ordinary skill in the art to modify the teachings of Walton with a number of multiplexing selection section as disclosed by Arai in order to control the information amount matching the transmission path conditions (*see column 1 lines 60-66*)

Consider **claim 2** and as applied to claim 1 above, Walton as modified by Arai disclose that the number of multiplexing selection section makes a number of multiplexing of a specific symbol smaller than a number of multiplexing of other transmit symbols (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20*)

Consider **claim 3** and as applied to claim 2 above, Walton as modified by Arai disclose wherein data for which better channel quality is required than for other data is allocated to said specific transmit symbol whose number of multiplexing has been reduced (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20, column 15 lines 5-15*)

Consider **claim 4** and as applied to claim 2 above, Walton as modified by Arai disclose wherein said specific symbol whose number of multiplexing has been reduced is placed at a start of a frame (*see figure 15 column 17 lines 62-67, column 18 lines 5-10 and lines 30-45*).

Consider **claim 5** and as applied to claim 2 above, Walton as modified by Arai disclose wherein said number of multiplexing selection section reduces a number of multiplexing of a retransmission symbol in accordance as a number of retransmissions increases (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20, column 15 lines 5-15*). Note that a retransmission occurs when interference or poor channel quality causes data to be lost. As Arai discloses that the multiplex number is reduced when transmitting data that is being affected by noise.

Consider **claim 6** and as applied to claim 2 above, Walton as modified by Arai disclose wherein a modulation M-ary number of said specific symbol whose number of multiplexing has been reduced is made smaller than a modulation M-ary number of other transmit symbols (*page 3 paragraph 0037*).

Consider **claim 7** and as applied to claim 2 above, Walton as modified by Arai disclose wherein said specific symbol whose number of multiplexing has been reduced is inserted periodically (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20, column 15 lines 53-63*).

Consider **claim 8** and as applied to claim 7 above, Walton as modified by Arai disclose an OFDM-CDMA receiving apparatus that receives and demodulates a signal transmitted from the OFDM-CDMA transmitting apparatus, and performs propagation path estimation result updating using said periodically inserted specific symbol whose number of multiplexing has been reduced (*see figure 4, column 7 lines 51-67, column 8 lines 41-65, column 11 lines 6-10 and 14-20, column 15 lines 53-63*).

Consider **claim 9** and as applied to claim 2 above, Walton as modified by Arai disclose wherein a number of multiplexing of said specific symbol whose number of multiplexing has been reduced is made "1" (*figures 13 and 16 steps 1301 and 1601, column 15 lines 11-14, 18-32, column 18 lines 15-25*).

Consider **claim 10** and as applied to claim 2 above, Walton as modified by Arai disclose wherein said orthogonal frequency division multiplexing section distributes chips of said

specific symbol whose number of multiplexing has been reduced only in a time axis direction
*see page 1 paragraph 000 and 0010, page 3 paragraph 0039- 0041 and 0044) (see column 9
lines 33-58, column 11 lines 6-10 and 14-20).*

Consider **claim 11** and as applied to claim 1 above, Walton as modified by Arai disclose
wherein said spreading section selects a spreading ratio for each transmit symbol and spreads a
transmit symbol (*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*).

Consider **claim 12** and as applied to claim 1 above, Walton as modified by Arai disclose
wherein said spreading section makes a spreading ratio of a specific symbol larger than a
spreading ratio of other transmit symbols (*Walton abstract, page 2 paragraph 0029 and page 8
paragraph 0109*).

Consider **claim 13** and as applied to claim 12 above, Walton as modified by Arai disclose
wherein data for which better channel quality is required than for other data is allocated to said
specific transmit symbol whose spreading ratio has been increased (*Walton abstract, page 2
paragraph 0029 and page 8 paragraph 0109) (see column 9 lines 33-58, column 11 lines 6-10
and 14-20)* .

Consider **claim 14** and as applied to claim 12 above, Walton as modified by Arai
disclose wherein said specific symbol whose spreading ratio has been increased is placed at a

Art Unit: 2617

start of a frame (*see figure 15 column 17 lines 62-67, column 18 lines 5-10 and lines 30-45*)
(*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*).

Consider **claim 15** and as applied to claim 12 above, Walton as modified by Arai disclose wherein said spreading section increases a spreading ratio of a retransmission symbol in accordance as a number of retransmissions increases (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20, column 15 lines 5-15*). Note that a retransmission occurs when interference or poor channel quality causes data to be lost. As Arai discloses that the multiplex number is reduced when transmitting data that is being affected by noise.

Consider **claim 16** and as applied to claim 12 above, Walton as modified by Arai disclose wherein a modulation M-ary number of said specific symbol whose spreading ratio has been increased is made smaller than a modulation M-ary number of other transmit symbols (*page 3 paragraph 0037*).

Consider **claim 17** and as applied to claim 12 above, Walton as modified by Arai disclose wherein said specific symbol whose spreading ratio has been increased is inserted periodically (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20, column 15 lines 53-63*).

Consider **claim 18** and as applied to claim 17 above, Walton as modified by Arai disclose an OFDM-CDMA receiving apparatus that receives and demodulates a signal transmitted from the OFDM-CDMA transmitting apparatus and performs propagation path estimation result

Art Unit: 2617

updating using said periodically inserted specific symbol whose spreading ratio has been increased (*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*). Note propagation path estimation is apparent because Walton discloses adjusting transmit power to accommodate lower data rates.

Consider **claim 19** and as applied to claim 17 above, Walton as modified by Arai disclose wherein said spreading section makes a spreading ratio of said specific symbol whose number of multiplexing has been reduced "1" (*figures 13 and 16 steps 1301 and 1601, column 15 lines 11-14, 18-32, column 18 lines 15-25*).

Consider **claim 20** and as applied to claim 12 above, Walton as modified by Arai disclose wherein said orthogonal frequency division multiplexing section distributes chips of said specific symbol whose spreading ratio has been increased only in a time axis direction *see page 1 paragraph 000 and 0010, page 3 paragraph 0039- 0041 and 0044*) (*see column 9 lines 33-58, column 11 lines 6-10 and 14-20*).

Consider **claim 22** and as applied to claim 21 above, Walton as modified by Arai disclose making a spreading ratio of a specific transmit symbol larger than a spreading ratio of other transmit symbols (*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*).

Claims **23-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Walton et al.** (US 20030081538) in view of **Arai et al** (US 6456607) in further view of **Hwang** (US 20020060994).

Consider **claim 23** and as applied to claim 2 above, Walton as modified by Arai disclose wherein said spreading section increases a number of spreading codes (*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*) but do not specifically disclose increasing a number of spreading codes assigned to a retransmission signal as a number of retransmissions increases and performs multicode multiplexing of a retransmission signal. In the related art Hwang discloses increasing a number of spreading codes assigned to a retransmission signal as a number of retransmissions increases and performs multicode multiplexing of a retransmission signal (*abstract, figure 6, page 1 paragraphs 0002 and 0003, page 3 paragraphs 0051, 0052 and 0054, page 5 paragraph 0084*).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Hwang with the teachings of Walton as modified by Arai to insure that retransmitted data is transmitted without data loss.

Consider **claim 24** and as applied to claim 23 above, Walton as modified by Arai disclose wherein said spreading section varies a number of spreading codes (*Walton abstract, page 2 paragraph 0029 and page 8 paragraph 0109*) but do not specifically disclose varying a number of spreading codes assigned to a retransmission signal as a number of retransmissions increases and performs multicode multiplexing of a retransmission signal assigned to said retransmission

Art Unit: 2617

signal in accordance with a number of other code division multiplexed signals multiplexed in said retransmission signal after multicode multiplexing (*abstract, figure 6, page 1 paragraphs 0002 and 0003, page 3 paragraphs 0051, 0052 and 0054, page 5 paragraph 0084*).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Hwang with the teachings of Walton as modified by Arai to insure that retransmitted data is transmitted without data loss.

Consider **claim 25** and as applied to claim 23 above, Walton as modified by Arai and Hwang disclose a transmission power control section that increases transmission power of said multicode-multiplexed said retransmission signal as a number of retransmissions increases *page 2 paragraph 0029 and page 8 paragraph 0109* (Hwang *page 1 paragraphs 0002 and 0003, page 3 paragraphs 0051, 0052 and 0054, page 5 paragraph 0084*).

Consider **claim 26** and as applied to claim 25 above, Walton as modified by Arai and Hwang disclose wherein said transmission power control section varies said transmission power in accordance with a number of other code division multiplexed signals multiplexed in said retransmission signal after multicode multiplexing. , (*page 2 paragraph 0029 and page 8 paragraph 0109*) (*page 1 paragraphs 0002 and 0003, page 3 paragraphs 0051, 0052 and 0054, page 5 paragraph 0084*).

Consider **claim 27** and as applied to claim 21, , Walton as modified by Arai the OFDM transmitting method but do not specifically disclose that the specific transmit symbol is a

Art Unit: 2617

retransmission signal, that retransmission signal is spread by means of a number of spreading codes in accordance with a number of retransmissions. In the related art Hwang discloses increasing a number of spreading codes assigned to a retransmission signal as a number of retransmissions increases and performs multicode multiplexing of a retransmission signal (*abstract, figure 6, page 1 paragraphs 0002 and 0003, page 3 paragraphs 0051, 0052 and 0054, page 5 paragraph 0084*).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Hwang with the teachings of Walton as modified by Arai to insure that retransmitted data is transmitted without data loss.

Conclusion

5. Any response to this Office Action should be **faxed to (571) 273-8300 or mailed to:**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

6. Any inquiry concerning this communication or earlier communications from the

6. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ibrahim A. Khan whose telephone number is (571) 270-1110. The Examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm.


If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Ibrahim A. Khan
I.A.K./iak

04/11/2007


NICK CORSARO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600